

# Arbor/Tecture: The Road to Cool Cities and Urban Islands

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# Trees – The Historical Perspective

- **As a Strategic Economic Interest**

- Transportation
- Fortress
- Smelting
- Shipbuilding
- Weaponry
- Value Trade Commodity

- **As a Social Interest**

- Shelter
- Fire
- Hunting and Food
- RELIGION

- **As a Environmental Interest**

- Soil Composition & Erosion
- Wildlife Habitat





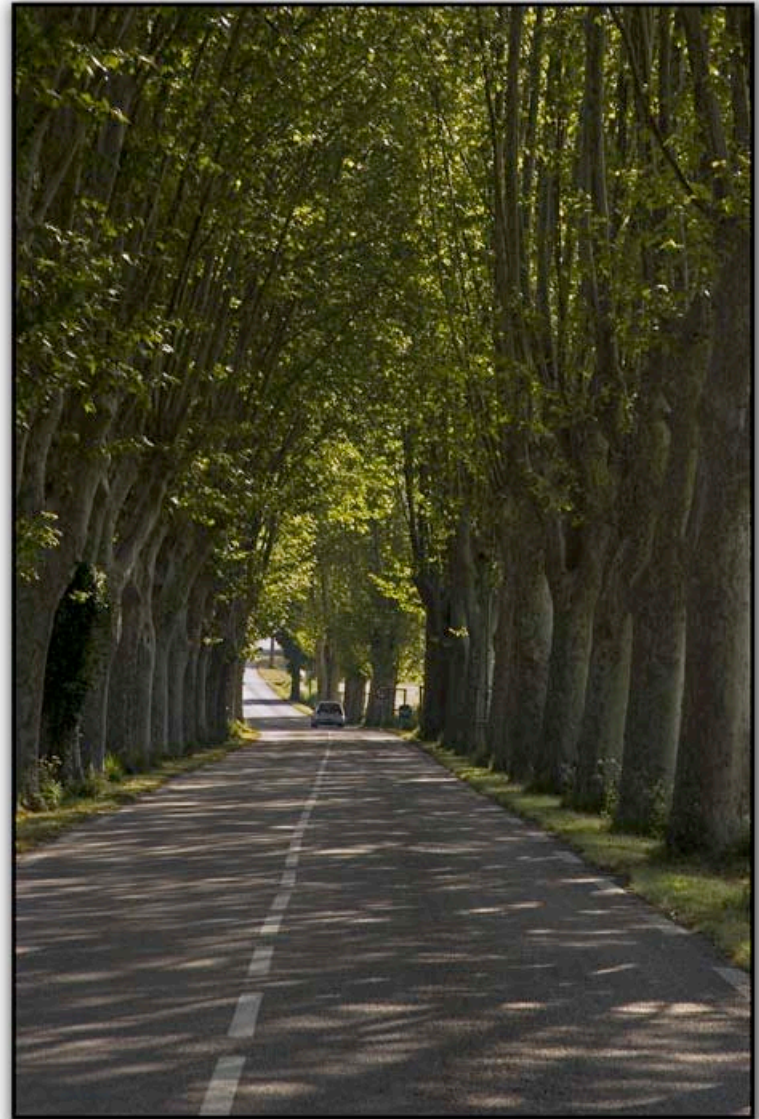
# Babylon: Ancient Eco-Metro & First Recorded Green Roof?





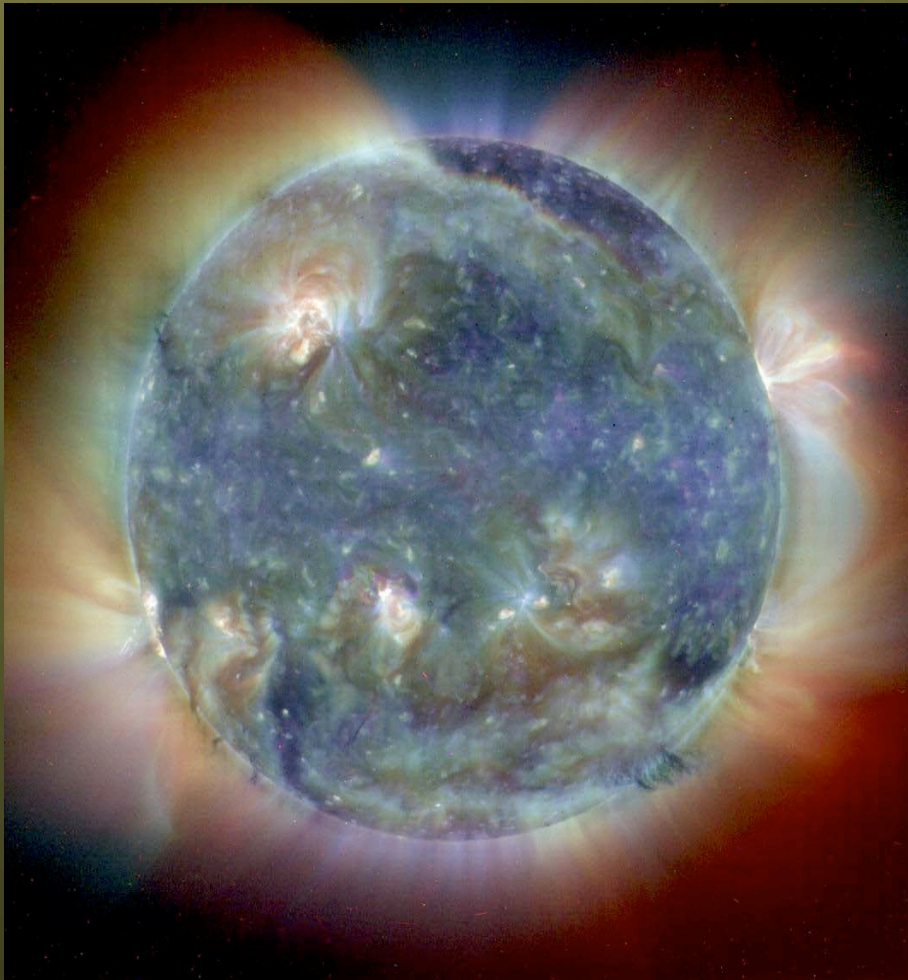
**NAPOLEON BONAPARTE**

**First Road Engineer to Use  
Green Infrastructure**



*Plane Trees, Provence, France*

# So What's That Got To Do With Today?!



- **More than 50% of the World Lives in Cities**
- **Around 80% of Europe Lives in Cities**
- **More than 80% of the United States . . .**

**. . . Lives in a City**



## And This is How We've Been Building Them

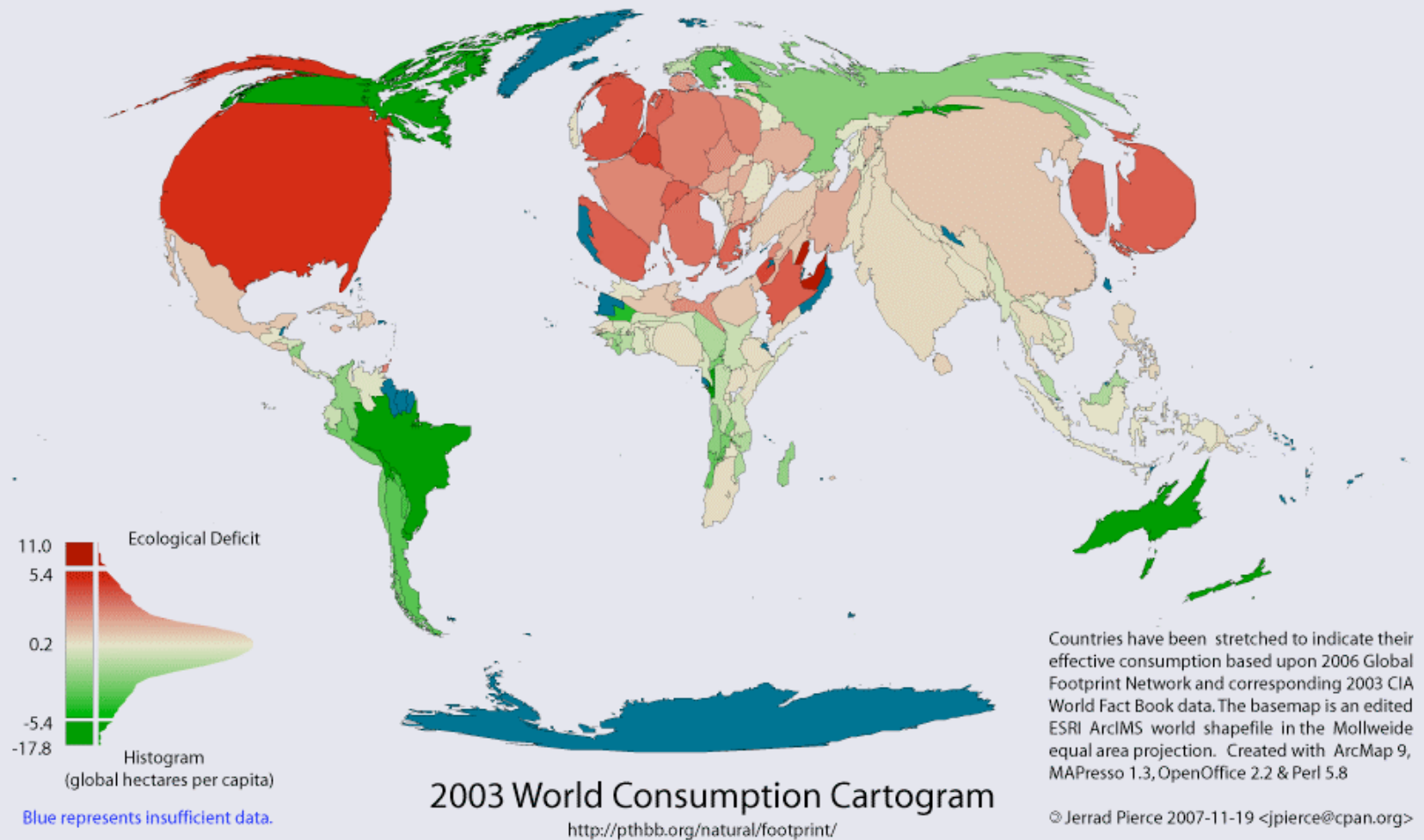
**Both dense urban centers, of a uniform impervious composite, in a vertical design that frustrates atmospheric mixing . . .**



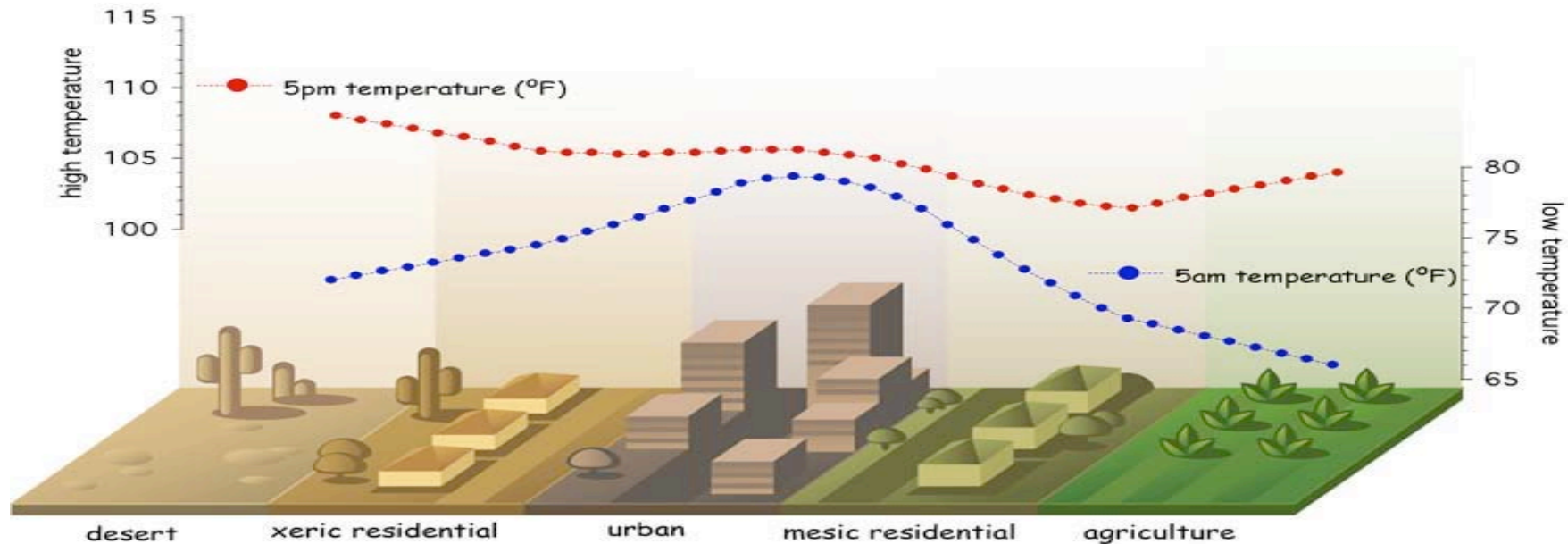
**. . . And suburban expansions, where the impervious surfaces are not just desirable (homestead footprints) but necessary (the Design of Vehicular Necessity)**



# Helping the World to Actually Look Like This...



# ... And Creating Urban Heat Islands



Urbanization converts permeable area to impermeable surfaces, such as roofs, roads, buildings, and parking lots – which trap radiant energy from the sun.

The accumulation of this stored energy eventually makes it impossible for the heat to dissipate overnight. This leads to “urban heat island effect,” marked by higher pollution levels, poor air quality, increased energy consumption, more runoff with higher pollution levels, and creation of micro-climates.

**Heat Events**  
**Impact Upon Human Health**  
**Impact on Surface and Coastal Waters**  
**Thermal Pollution**  
**Impact on Air Quality**  
**Increased Energy Consumption & Independent Climates**



After 48 hours of continuous exposure to heat, the body's defenses begin to fail.

By Friday, July 14<sup>th</sup>, thousands of Chicagoans had developed severe heat-related illnesses.

Twenty-three hospitals went on bypass status, closing their emergency room doors. Ambulance crews drove around the city for miles, looking for an open bed.

Nearly 700 people died.

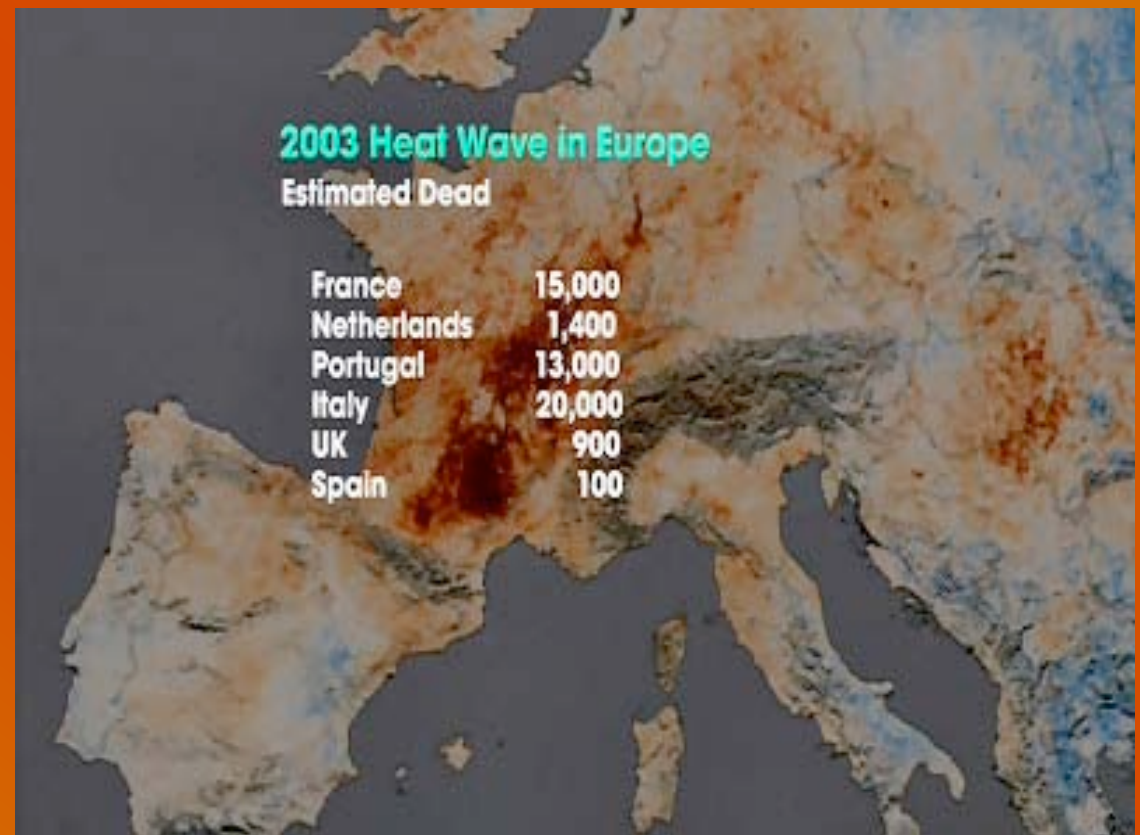
## Heat Wave – Chicago 1995



# Heat Wave – Europe 2003

**Most of France's 14,802 fatalities took place among the elderly.**

**The heat wave not only provoked a continental health crisis, but the attendant drought crashed food crops in southern Europe.**

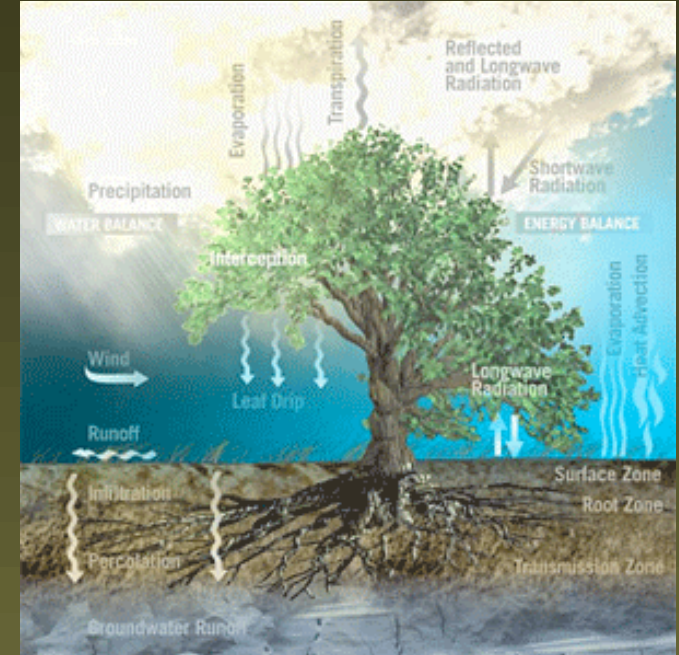




# The Role of Trees



Hardscape lifespan, energy consumption, real estate values (incl. turnover, vacancy, workforce)



Air quality, microclimate control, health indicator



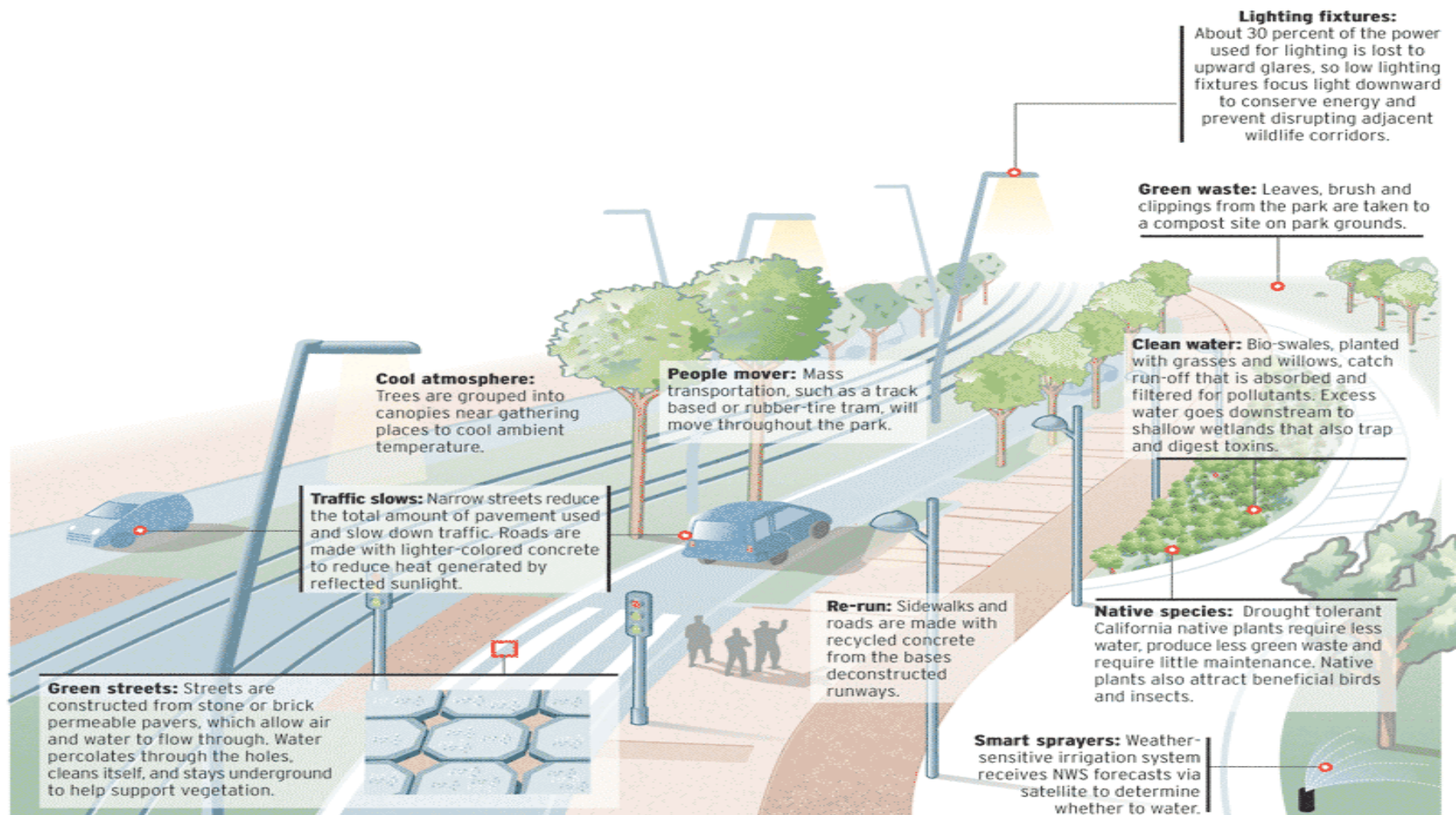
Economic, retail stimulus



Coastal Integrity, Erosion, Thermal Pollution, Healthy Waters



# Combining Natural Systems with Manmade Technologies for a "Treatment Chain"



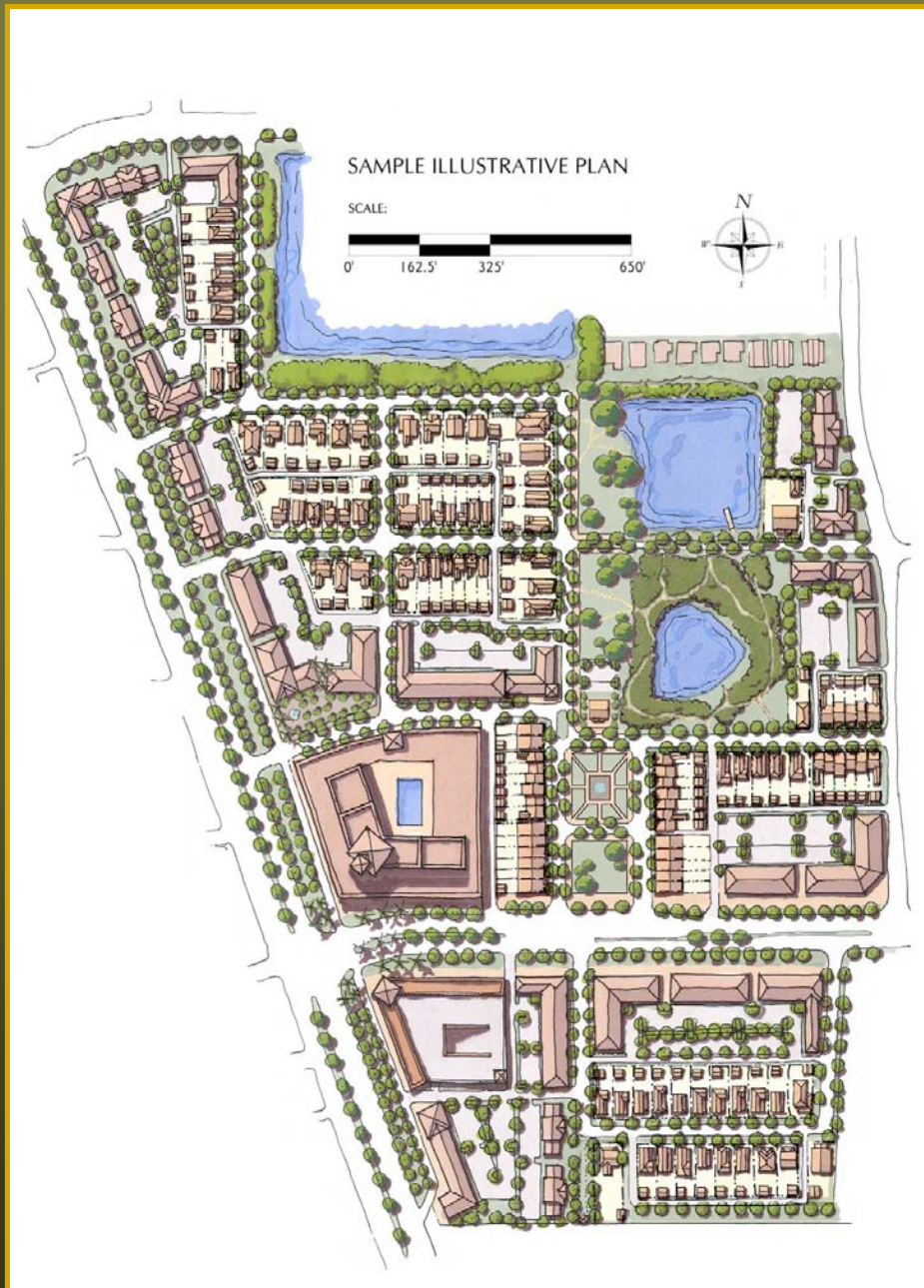
Source: Fuscoe Engineering Inc.

Graphics reporting by Chantal J. Lamers

Molly Zisk / The Register



## Design for Living Streets and Urban Islands



- **Development Costs reduced**
- **VMT are drastically reduced**
- **Gray Infrastructure Becomes Context-Sensitive**
- **Promotes Walkable, Recreational Urban Centers**
- **Promotes Public Health**
- **Dollars of the Conventional Operating Model can be Moved to Other Social, Environmental and Economic Initiatives**

# Infrastructure Chains Connect the Resources of our Present with the Technology of our Future

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